Journal of
POLYMER SCIENCE

VOLUME XLII·1960

Editorial Board: P. M. DOTY • R. M. FUOSS • H. MARK
H. W. MELVILLE • C. G. OVERBERGER • G. SMETS

Advisory Board:

T. ALFREY, JR. *Midland, Mich.*
W. O. BAKER *Murray Hill, N. J.*
P. D. BARTLETT *Cambridge, Mass.*
H. BENOIT *Strasbourg*
E. R. BLOUT *Cambridge, Mass.*
J. W. BREITENBACH *Vienna*
C. W. BUNN *Welwyn Garden City*
G. M. BURNETT *Aberdeen*
S. CLAESSON *Uppsala*
F. S. DAINTON *Leeds*
P. DEBYE *Ithaca, N. Y.*
F. EIRICH *Brooklyn, N. Y.*
P. J. FLORY *Pittsburgh, Pa.*
N. G. GAYLORD *New York, N. Y.*
G. GEE *Manchester*
A. KATCHALSKY *Rehovoth*
G. M. KLINE *Washington, D. C.*
I. M. KOLTHOFF *Minneapolis, Minn.*
W. KUHN *Basel*
M. MAGAT *Paris*
C. S. MARVEL *Urbana, Ill.*
G. NATTA *Milan*
A. PETERLIN *Ljubljana*
C. C. PRICE *Philadelphia, Pa.*
CH. SADRON *Strasbourg*
G. V. SCHULZ *Mainz*
H. M. SPURLIN *Wilmington, Del.*
A. J. STAVERMAN *Leiden*
W. H. STOCKMAYER *Cambridge, Mass.*
A. V. TOBOLSKY *Princeton, N. J.*
K. UEBERREITER *Berlin*
B. H. ZIMM *Schenectady, N. Y.*

INTERSCIENCE PUBLISHERS, INC.

© 1960, by Interscience Publishers, Inc.

CONTENTS

Vol. XLII, Issue Nos. 139–140

Journal of Polymer Science

ISSUE NO. 139, JANUARY

Editorial 1

K. M. SINNOTT: Nuclear Magnetic Resonance and Molecular Motion in Polymethyl Acrylate, Polymethyl Methacrylate, and Polyethyl Methacrylate 3

BACON KE: Characterization of Polyolefins by Differential Thermal Analysis 15

G. GOOBERMAN: Ultrasonic Degradation of Polystyrene. Part I. A Proposed Mechanism for Degradation 25

G. GOOBERMAN and J. LAMB: Ultrasonic Degradation of Polystyrene. Part II. Experimental 35

FRASER P. PRICE: The Growth Habit of Single Polymer Crystals .. 49

A. M. SAUM: Intermolecular Association in Organic Nitriles; the CN Dipole-pair Bond 57

JOAN BOND and T. I. JONES: The Ferrous Chelates of Polyaminocarboxylic Acids as Initiators in the Emulsion Polymerization of Styrene. I 67

JOAN BOND and T. I. JONES: The Ferrous Chelates of Polyaminocarboxylic Acids as Initiators in the Emulsion Polymerization of Styrene. II 75

C. BOOTH and L. R. BEASON: The Statistical Analysis of Polymer Fractionation Data. Part I 81

C. BOOTH and L. R. BEASON: The Statistical Analysis of Polymer Fractionation Data. Part II 93

RICHARD H. WILEY and W. A. TRINLER: 4-Vinylbenzenephosphonic Acid 113

RICHARD H. WILEY and DAVID E. GENSHEIMER: γ-Radiation-Induced Polymerization of Ethenesulfonamide 119

H. MORAWETZ: Characterization of Counterion Distribution in Polyelectrolyte Solutions by the Rate of Reaction of Two Charged Species 125

RALPH L. DANNLEY and HENRY J. ESSIG: The Incorporation of Aroyl Peroxide Fragments in Polystyrene 129

J. P. LUONGO: Infrared Study of Oxygenated Groups Formed in Polyethylene During Oxidation 139

R. BACSKAI and H. A. POHL: Stereospecificity and Electric Polarization in High Polymers 151

M. LITT and M. SZWARC: Molecular Weight Distribution in Anionic Polymerization Involving a Chain Transfer to Monomer 159

J. Mann, L. Roldan-Gonzalez, and H. J. Wellard: Crystalline Modifications of Cellulose. Part IV. Determination of X-Ray Intensity Data 165
D. W. Jones: Crystalline Modifications of Cellulose. Part V. A Crystallographic Study of Ordered Molecular Arrangements ... 173
D. G. Fisher and J. Mann: Crystalline Modifications of Cellulose. Part VI. Unit Cell and Molecular Symmetry of Cellulose I 189
D. K. Thomas and A. Charlesby: Viscosity Relationship in Solutions of Polyethylene Glycols 195
Y. Nakamura, T. Koide, and M. Negishi: The Effect of Polymer Dilution on Acid-Catalyzed Gelation of Partially *N*-Methylolcarbamoylethylated Polyvinyl Alcohol 203
Nishio Hirai: Absolute Rate Theory for Spherulite Growth of Polymeric Substances 213
Audrey Todd: The Mechanisms of Radiation-Induced Changes in Vinyl Polymers 223
Arthur J. Yu and Robert D. Evans: Isomorphous Replacement in Copolyamide Systems: Adipic and Terephthalic Acids 249
Andrzej Broda: Selectivity of Polymer Fractionation. I 259

LETTERS TO THE EDITORS

R. E. Glick, R. P. Gupta, J. A. Sauer, and A. E. Woodward: Proton Magnetic Resonance of Poly(hexamethylene Adipamide) 271
D. R. Holmes: Comment on "Molecular Motion in Polyethylene" by McCall and Slichter 273
D. R. Holmes: Comments on "Crystal Structures in Polyamides from ω-Amino Acids" by Slichter 274
R. J. Clark, R. L. Miller, R. S. Stein, and P. R. Wilson: The Scattering of Light from Polyethylene Samples Having "Ringed" Spherulites 275
J. H. Wakelin, Alison Sutherland, and Louis R. Beck, Jr.: Linear Thermal Expansion Coefficients for the Crystalline Phase in High Polymers 278

Abstracts from *High Molecular Weight Compounds* (*Vysokomolekulyarnye Soedineniya*), Volume I, Issue 7, July 1959 281

Issue No. 140, February

J. Reid Shelton, E. T. McDonel, and John C. Crano: A Study of the Deuterium Isotope Effect in Antioxidant Activity 289
Irving Kuntz and Arthur Gerber: The Butyllithium-Initiated Polymerization of 1,3-Butadiene 299
Robert Simha and J. M. Zimmerman: Synthesis Kinetics and Sequence Distribution in Synthetic Polynucleotides 309
Samuel H. Maron and Nobuyuki Nakajima: A Theory of the Thermodynamic Behavior of Nonelectrolyte Solutions. III. The Osmotic Pressure of Polymer Solutions 327
Leon Segal and Leopold Loeb: Studies of the Ethylenediamine-Cellulose Complex. II. Stability of the Complex 341
Leon Segal and Leopold Loeb: The Diethylenetriamine-Cellulose Complex 351
Lawrence E. Nielsen: Transitions in Ethylene Polymers 357

WILLIAM E. GOODE, WILLIAM H. SNYDER, and ROBERT C. FETTES: Anionic Polymerization. Mechanism of Methyl Methacrylate Polymerizations Initiated by Metal Amides in Liquid Ammonia. 367
JAN O. KONECNY, CATHERINE M. DOUGLAS, and MARILEE Y. GRAY: Polymerization of Dichlorophosphinic Nitrides. 383
THOR L. SMITH and ALAN B. MAGNUSSON: Diisocyanate-Linked Polymers. II. Mechanical and Swelling Properties of Some Polyurethane Elastomers. 391
NORMAN G. GAYLORD, TI-KANG KWEI, and HERMAN F. MARK: Polymerization of Butadiene with Aluminum Triisobutyl–Titanium Tetrachloride Catalyst System. 417
A. A. MILLER: A Kinetic Analysis for the Free-Radical Crosslinking of Saturated Polymers. 441
DERICK W. OVENALL: Ultrasonic Degradation of Polymer Molecules in Solution: Some Comments on Recent Papers. 455
GEORGE G. LOWRY: The Effect of Depropagation on Copolymer Composition. I. General Theory for One Depropagating Monomer. 463
RICHARD H. WILEY and EDWIN E. SALE: Tracer Techniques for the Determination of Monomer Reactivity Ratios. I. A Direct Counting Technique Applied to the Styrene–Methacrylate Copolymerization. 479
RICHARD H. WILEY and EDWIN E. SALE: Tracer Techniques for the Determination of Monomer Reactivity Ratios. II. Monomer Reactivity Ratios in Copolymerizations with Divinyl Monomers. 491
ROGER K. GRAHAM, DAVID L. DUNKELBERGER, and ELIZABETH S. COHN: The Initiation of Polymerization of Methyl Methacrylate by the Poly(methyl Methacrylate) Anion. 501
SHIRO MATSUOKA: Pressure-Induced Crystallization in Polyethylene. 511
PAUL R. SWAN: Polyethylene Specific Volume, Crystallinity, and Glass Transition. 525
S. OKAMURA, K. KATAGIRI, and T. YONEZAWA: Relative Reactivities of Polymer Radicals. 535
RYUZO ASAMI and NIICHIRO TOKURA: Cationic Polymerization in Liquid Sulfur Dioxide. I. Cationic Polymerization of Styrene with $SnCl_4$. 545
RYUZO ASAMI and NIICHIRO TOKURA: Cationic Polymerization in Liquid Sulfur Dioxide. II. Cationic Polymerization of Styrene with the Friedel-Crafts-Type and Other Acid Catalysts. 553
R. NOEL, D. PATTERSON, and T. SOMCYNSKY: Polymer Chain Dimensions in Mixed Solvents. 561
ROBERT E. CUNNINGHAM: Interaction Constants for the System Isoprene–*cis*-1,4-Polyisoprene (Synthetic). 571

LETTERS TO THE EDITORS

GEORGE G. ODIAN, ALBERT ROSSI, and EDWARD N. TRACHTENBERG: The Accelerating Effect of Methanol on the Gamma Radiation-Induced Graft Copolymerization of Styrene to Polyethylene. 575
W. P. BAKER, JR.: Monomer Reactivity Ratios of Vinyl Chloride–Vinyl Acetate. 578
R. I. C. MICHIE, A. SHARPLES, and R. J. E. CUMBERBIRCH: Comment on the Fringed Fibril Theory of Structure in Crystalline Polymers. 580

NOTES

R. C. GOLIKE: Symmetry and Dimensions of the Crystalline Unit Cell of Polyvinyl Fluoride 583
K. J. IVIN: Thermodynamic Functions for Monomeric and Polymeric Sulfur 585
D. H. GRANT and N. GRASSIE: Identification of Methacrylonitrile as a Decomposition Product of α,α'-Azoisobutyronitrile 587

BOOK REVIEW

Proceedings of the Second Cellulose Research Conference at the Cellulose Research Institute. Reviewed by HAROLD M. SPURLIN 589

ERRATA

P. HITTMAIR, H. F. MARK, and ROBERT ULLMAN: Stress Cracking in Polyethylene (article in *J. Polymer Sci.*, **33,** 505–507, 1958) 590
P. H. HERMANS, D. HEIKENS, and A. WEIDINGER: A Quantitative Investigation on the X-Ray Small Angle Scattering of Cellulose Fibers. Part II. The Scattering Power of Various Cellulose Fibers (article in *J. Polymer Sci.*, **35,** 145–165, 1959) 590
W. P. SLICHTER: Crystal Structures in Polyamides Made from ω-Amino Acids (article in *J. Polymer Sci.*, **36,** 259–266, 1959) 590
LEON MARKER, ROBERT EARLY, and SUNDAR L. AGGARWAL: Melt Viscosity of Polyethylenes. Shear Dependence of Viscosity (article in *J. Polymer Sci.*, **38,** 381–392, 1959) 590

Abstracts from *High Molecular Weight Compounds* (*Vysokomolekulyarnye Soedineniya*), Volume I, Issue 8, August 1959 591

Author Index, Volume XLII 599

Subject Index, Volume XLII 601

AUTHOR INDEX, VOLUME XLII

Aggarwal, S. L.: see Marker, L.
Asami, R., and Tokura, N.: Cationic polymerization in liquid sulfur dioxide, I. Cationic polymerization of styrene with $SnCl_4$, 545
——, and ——: Cationic polymerization in liquid sulfur dioxide. II. Cationic polymerization of styrene with the Friedel-Crafts-type and other acid catalysts, 553
Bacskai, R., and Pohl, H. A.: Stereospecificity and electric polarization in high polymers, 151
Baker, W. P., Jr.: Monomer reactivity ratios of vinyl chloride–vinyl acetate, 578
Beason, L. R.: see Booth, C.
Beck, L. R., Jr.: see Wakelin, J. H.
Bond, J., and Jones, T. I.: The ferrous chelates of polyaminocarboxylic acids as initiators in the emulsion polymerization of styrene. I, 67
——, and ——: The ferrous chelates of polyaminocarboxylic acids as initiators in the emulsion polymerization of styrene. II, 75
Booth, C., and Beason, L. R.: The statistical analysis of polymer fractionation data. Part I, 81
——, and ——: The statistical analysis of polymer fractionation data. Part II, 93
Broda, A.: Selectivity of polymer fractionation. I, 259
Charlesby, A.: see Thomas, D. K.
Clark, R. J., Miller, R. L., Stein, R. S., and Wilson, P. R.: The scattering of light from polyethylene samples having "ringed" spherulites, 275
Cohn, E. S.: see Graham, R. K.
Crano, J. C.: see Shelton, J. R.
Cumberbirch, R. J. E.: see Michie, R. I. C.
Cunningham, R. E.: Interaction constants for the system isoprene–*cis*-1,4-polyisoprene (synthetic), 571
Dannley, R. L., and Essig, H. J.: The incorporation of aroyl peroxide fragments in polystyrene, 129
Douglas, C. M.: see Konecny, J. O.
Dunkelberger, D. L.: see Graham, R. K.
Early, R.: see Marker, L.
Essig, H. J.: see Dannley, R. L.
Evans, R. D.: see Yu, A. J.
Fettes, R. C.: see Goode, W. E.
Fisher, D. G., and Mann, J.: Crystalline modifications of cellulose. Part VI. Unit cell and molecular symmetry of cellulose I, 189
Gaylord, N. G., Kwei, T.-K., and Mark, H. F.: Polymerization of butadiene with aluminum triisobutyl–titanium tetrachloride catalyst system, 417
Gensheimer, D. E.: see Wiley, R. H.
Gerber, A.: see Kuntz, I.
Glick, R. E., Gupta, R. P., Sauer, J. A., and Woodward, A. E.: Proton magnetic resonance of poly(hexamethylene adipamide), 271
Golike, R. C.: Symmetry and dimensions of the crystalline unit cell of polyvinyl fluoride, 583
Gooberman, G.: Ultrasonic degradation of polystyrene. Part I. A proposed mechanism for degradation, 25
——, and Lamb, J.: Ultrasonic degradation of polystyrene. Part II. Experimental, 35
Goode, W. E., Snyder, W. H., and Fettes, R. C.: Anionic polymerization. Mechanism of methyl methacrylate polymerizations initiated by metal amides in liquid ammonic, 367
Graham, R. K., Dunkelberger, D. L., and Cohn, E. S.: The initiation of polymerization of methyl methacrylate by the poly(methyl methacrylate) anion, 501
Grant, D. H., and Grassie, N.: Identification of methacrylonitrile as a decomposition product of α,α'-azoisobutyronitrile, 587
Grassie, N.: see Grant, D. H.
Gray, M. Y.: see Konecny, J. O.
Gupta, R. P.: see Glick, R. E.
Heikens, D.: see Hermans, P. H.
Hermans, P. H., Heikens, D., and Weidinger, A.: A quantitative investigation on the x-ray small angle scattering of cellulose fibers. Part II. The scattering power of various cellulose fibers (*errata*), 590
Hirai, N.: Absolute rate theory for spherulite growth of polymeric substances, 213
Hittmair, P., Mark, H. F., and Ullman, R.: Stress cracking in polyethylene (*errata*), 590
Holmes, D. R.: Comment on "Molecular motion in polyethylene" by McCall and Slichter, 273
——: Comments on "Crystal structures in polyamides from ω-amino acids" by Slichter, 274
Ivin, K. J.: Thermodynamic functions for monomeric and polymeric sulfur, 585
Jones, D. W.: Crystalline modifications of cellulose. Part V. A crystallographic study of ordered molecular arrangements, 173
Jones, T. I.: see Bond, J.
Katagiri, K.: see Okamura, S.
Ke, B.: Characterization of polyolefins by differential thermal analysis, 15

Koide, T.: see Nakamura, Y.
Konecny, J. O., Douglas, C. M., and Gray, M. Y.: Polymerization of dichlorophosphinic nitrides, 383
Kuntz, I., and Gerber, A.: The butyllithium-initiated polymerization of 1,3-butadiene, 299
Kwei, T.-K.: see Gaylord, N. G.
Lamb, J.: see Gooberman, G.
Litt, M., and Szwarc, M.: Molecular weight distribution in anionic polymerization involving a chain transfer to monomer, 159
Loeb, L.: see Segal, L.
Lowry, G. G.: The effect of depropagation on copolymer composition. I. General theory for one depropagating monomer, 463
Luongo, J. P.: Infrared study of oxygenated groups formed in polyethylene during oxidation, 139
McDonel, E. T.: see Shelton, J. R.
Magnusson, A. B.: see Smith, T. L.
Mann, J., Roldan-Gonzales, L., and Wellard, H. J.: Crystalline modifications of cellulose. Part IV. Determination of x-ray intensity data, 165
——: see Fisher, D. G.
Mark, H. F.: see Gaylord, N. G.
——: see Hittmair, P.
Marker, L., Early, R., and Aggarwal, S. L.: Melt viscosity of polyethylenes. Shear dependence of viscosity (*errata*), 590
Maron, S. H., and Nakajima, N.: A theory of the thermodynamic behavior of nonelectrolyte solutions. III. The osmotic pressure of polymer solutions, 327
Matsuoka, S.: Pressure-induced crystallization in polyethylene, 511
Michie, R. I. C., Sharples, A., and Cumberbirch, R. J. E.: Comment on the fringed fibril theory of structure in crystalline polymers, 580
Miller, A. A.: A kinetic analysis for the free-radical crosslinking of saturated polymers, 441
Miller, R. L.: see Clark, R. J.
Morawetz, H.: Characterization of counterion distribution in polyelectrolyte solutions by the rate of reaction of two charged species, 125
Nakajima, N.: see Maron, S. H.
Nakamura, Y., Koide, T., and Nagishi, M.: The effect of polymer dilution on acid-catalyzed gelation of partially *N*-methylolcarbamoylethylated polyvinyl alcohol, 203
Negishi, M.: see Nakamura, Y.
Nielsen, L. E.: Transitions in ethylene polymers, 357
Noel, R., Patterson, D., and Somcynsky, T.: Polymer chain dimensions in mixed solvents, 561
Odian, G. G., Rossi, A., and Trachtenberg, E. N.: The accelerating effect of methanol on the gamma radiation-induced graft copolymerization of styrene to polyethylene, 575
Okamura, S., Katagiri, K., and Yonezawa, T.: Relative reactivities of polymer radicals, 535
Ovenall, D. W.: Ultrasonic degradation of polymer molecules in solution: Some comments on recent papers, 455
Patterson, D.: see Noel, R.
Pohl, H. A.: see Bacskai, R.
Price, F. P.: The growth habit of single polymer crystals, 49
Roldan-Gonzales, L.: see Mann, J.
Rossi, A.: see Odian, G. G.
Sale, E. E.: see Wiley, R. H.
Sauer, J. A.: see Glick, R. E.
Saum, A. M.: Intermolecular association in organic nitriles; the CN dipole-pair bond, 57
Segal, L., and Loeb, L.: The diethylenetriamine-cellulose complex, 351
——, and ——: Studies of the ethylenediamine-cellulose complex. II. Stability of the complex, 341
Sharples, A.: see Michie, R. I. C.
Shelton, J. R., McDonel, E. T., and Crano, J. C.: A study of the deuterium isotope effect in antioxidant activity, 289
Simha, R., and Zimmerman, J. M.: Synthesis kinetics and sequence distribution in synthetic polynucleotides, 309
Sinnott, K. M.: Nuclear magnetic resonance and molecular motion in polymethylacrylate, polymethyl methacrylate, and polyethyl methacrylate, 3
Slichter, W. P.: Crystal structures in polyamides made from ω-amino acids (*errata*), 590
Smith, T. L., and Magnusson, A. B.: Diisocyanate-linked polymers. II. Mechanical and swelling properties of some polyurethane elastomers, 391
Snyder, W. H.: see Goode, W. E.
Somcynsky, T.: see Noel, R.
Stein, R. S.: see Clark, R. J.
Sutherland, A.: see Wakelin, J. H.
Swan, P. R.: Polyethylene specific volume, crystallinity, and glass transition, 525
Szwarc, M.: see Litt, M.
Thomas, D. K., and Charlesby, A.: Viscosity relationship in solutions of polyethylene glycols, 195
Todd, A.: The mechanisms of radiation-induced changes in vinyl polymers, 223
Tokura, N.: see Asami, R.
Trachtenberg, E. N.: see Odian, G. G.
Trinler, W. A.: see Wiley, R. H.
Ullman, R.: see Hittmair, P.
Wakelin, J. H., Sutherland, A., and Beck, L. R., Jr.: Linear thermal expansion coefficients for the crystalline phase in high polymers, 278
Weidinger, A.: see Hermans, P. H.
Wellard, H. J.: see Mann, J.
Wiley, R. H., and Gensheimer, D. E.: γ-Radiation-induced polymerization of ethenesulfonamide, 119
——, and Sale, E. E.: Tracer technique for the determination of monomer reactivity ratios. I. A direct counting

technique applied to the styrene–methacrylate copolymerization, 479
——, and ——: Tracer technique for the determination of monomer reactivity ratios. II. Monomer reactivity ratios in copolymerizations with divinyl monomers, 491
——, and Trinler, W. A.: 4-Vinylbenzenephosphonic acid, 113
Wilson, P. R.: see Clark, R. J.
Woodward, A. E.: see Glick, R. E.
Yonezawa, T.: see Okamura, S.
Yu, A. J., and Evans, R. D.: Isomorphous replacement in copolyamide systems: adipic and terephthalic acids, 249
Zimmerman, J. M.: see Simha, R.

SUBJECT INDEX, VOLUME XLII

Anionic polymerization, 367
molecular weight distribution in, 159
α,α'-Azoisobutyronitrile, methacrylonitrile from, 587
Butadiene, polymerization, 417
1,3-Butadiene, butyllithium-initiated polymerization, 299
Catalysts, aluminum triisobutyl–titanium tetrachloride as, 417
Cationic polymerization, in liquid sulfur dioxide, 545, 553
Cellulose, crystalline modifications, 165, 173, 189
fibers, x-ray small angle scattering, 590
Cellulose I, unit cell and molecular symmetry, 189
Cellulose-diethylenetriamine complex, 351
Cellulose-ethylenediamine complex, 341
Chain dimensions, in mixed solvents, 561
Copolyamide systems, isomorphous replacement in, 249
Crosslinking, free-radical, kinetic analysis of, 441
Crystalline polymers, fringed fibril theory of structure in, 580
Crystals, growth habit, 49
Crystal structures, polyamides, 274, 590
Crystallinity, polyethylene, 525
Crystallization, polyethylene, 511
Degradation, ultrasonic, 455
ultrasonic, of polystyrene, 25, 35
Depropagation, effect on copolymer composition, 463
Deuterium, isotope effect in antioxidant activity, 289
Dichlorophosphinic nitrides, polymerization, 383
Diethylenetriamine-cellulose complex, 351
Diisocyanate-linked polymers, 391
Distribution, in polynucleotide synthesis, 309
Divinyl monomers, reactivity ratios in copolymerizations with, 491
Emulsion polymerization, styrene, 67, 75
Ethenesulfonamide, gamma radiation-induced polymerization, 119
Ethylenediamine-cellulose complex, 341
Ethylene polymers, transitions in, 357
Expansion coefficients, linear thermal, for crystalline phase, 278
Fractionation, selectivity of, 259
Fractionation data, statistical analysis, 81, 93
Glass transition, polyethylene, 525
Graft copolymerization, styrene to polyethylene, 575
Initiators, butyllithium as, 299
ferrous chelates of polyaminocarboxylic acids as, 67, 75
metal amides as, 367
polymethyl methacrylate anion as, 501
Infrared study, oxygenated groups in polyethylene, 139
Interaction constants, isoprene–*cis*-1,4-polyisoprene, 571
Isoprene, interaction constants with *cis*-1,4-polyisoprene, 571
Kinetics, free-radical crosslinking, 441
polynucleotide synthesis, 309
Light scattering, polyethylene, 275
Mechanical properties, polyurethane elastomers, 391
Melt viscosity, polyethylenes, 590
Methacrylate, copolymerization with styrene, 479
Methacrylonitrile, from α,α'-azoisobutyronitrile, 587
Methyl methacrylate, polymerization, 367, 501
N-Methylolcarbamoylethylated polyvinyl alcohol, gelation, 203
Molecular motion, polyethylene, 273
polymethyl acrylate, polymethyl methacrylate, and polyethyl methacrylate, 3
Molecular weight distribution, in anionic polymerization, 159
Nitriles, organic, intermolecular association, 57
Nonelectrolyte solutions, thermodynamic behavior, 327
Nuclear magnetic resonance, polymethyl acrylate, polymethyl methacrylate, and polyethyl methacrylate, 3
Osmotic pressure, polymer solutions, 327
Oxidation, of polyethylene, 139
Polarization, electric, in high polymers, 151
Polyamides, crystal structures, 274, 590
Polyaminocarboxylic acids, of ferrous chelates, as initiators, 67, 75
Polyelectrolyte solutions, counterion distribution in, 125
Polyethylene, crystallization, 511
graft copolymerization on styrene, 575
light scattering, 275
melt viscosity, 590
molecular motion in, 273

Polyethylene (*continued*)
oxygenated groups in, 139
specific volume, crystallinity, and glass transition, 525
stress cracking in, 590
Polyethylene glycols, viscosity, 195
Polyethyl methacrylate, nuclear magnetic resonance, 3
Polyhexamethylene adipamide, proton magnetic resonance of, 271
cis-1,4-Polyisoprene, interaction constants with isoprene, 571
Polymethyl acrylate, nuclear magnetic resonance, 3
Polymethyl methacrylate, nuclear magnetic resonance, 3
Polynucleotides, synthesis kinetics and sequence distribution, 309
Polyolefins, characterization by differential thermal analysis, 15
Polystyrene, aroyl peroxide fragments in, 129
ultrasonic degradation, 25, 35
Polyurethane elastomers, mechanical and swelling properties, 391
Polyvinyl alcohol, *N*-methylolcarbamoylethylated, 203
Polyvinyl fluoride, symmetry and dimensions of the crystalline unit cell, 583
Proton magnetic resonance, polyhexamethylene adipamide, 271
Radiation, and changes in vinyl polymers, 223
γ-Radiation, for graft copolymerization of styrene on polyethylene, 575
and polymerization of ethenesulfonamide, 119
Radicals, free, kinetic analysis of crosslinking, 441
polymer, relative reactivities of, 535
Reactivities, relative, of polymer radicals, 535
Reactivity ratios, determination, 479, 491
vinyl chloride–vinyl acetate, 578
Shear dependence, of viscosity, 590
Specific volume, polyethylene, 525
Spherulite growth, rate theory, 213
Stereospecificity, in high polymers, 151
Stress cracking, in polyethylene, 590
Styrene, cationic polymerization, 545, 553
copolymerization with methacrylate, 479
emulsion polymerization, 67, 75
graft copolymerization to polyethylene, 575
Sulfur, thermodynamic functions, 585
Swelling properties, polyurethane elastomers, 391
Thermal analysis, differential, for characterization of polyolefins, 15
Thermodynamics, nonelectrolyte solutions, 327
sulfur, 585
Ultrasonic degradation, 455
of polystyrene, 25, 35
Vinyl acetate, reactivity ratios with vinyl chloride, 578
4-Vinylbenzenephosphonic acid, 113
Vinyl chloride, reactivity ratios with vinyl acetate, 578
Vinyl polymers, radiation-induced changes, 223
Viscosity, in polyethylene glycols, 195
X-ray, for cellulose determination, 165
small angle scattering of cellulose fibers, 590